TRANSLATION

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

| Applicant's or agent's file reference | FOR FURTHER ACTION | See Form PCT/IPEA/416 |
|---|---|---|
| 904492 | | |
| International application No. | International filing date *(day/month/year)* | Priority date *(day/month/year)* |
| PCT/JP2004/019341 | 24.12.2004 | 14.01.2004 |

International Patent Classification (IPC) or national classification and IPC

B23B27/22, B23B27/20

Applicant

SUMITOMO ELECTRIC HARDMETAL CORP.

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☐ *(sent to the applicant and to the International Bureau)* a total of _____ sheets, as follows:

      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

| | | |
|---|---|---|
| ☒ | Box No. I | Basis of the report |
| ☐ | Box No. II | Priority |
| ☐ | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| ☐ | Box No. IV | Lack of unity of invention |
| ☒ | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| ☐ | Box No. VI | Certain documents cited |
| ☐ | Box No. VII | Certain defects in the international application |
| ☐ | Box No. VIII | Certain observations on the international application |

| Date of submission of the demand | Date of completion of this report |
|---|---|
| Name and mailing address of the IPEA/JP<br><br>Facsimile No. | Authorized officer<br><br>Telephone No. |

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.
PCT/JP2004/019341

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rule 12.3 and 23.1(b))

☐ publication of the international application (Rule 12.4)

☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☒ the international application as originally filed/furnished

☐ the description:

pages _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ the claims:

nos. _____ as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* _____ received by this Authority on _____

nos.* _____ received by this Authority on _____

☐ the drawings:

sheets _____ as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.
PCT/JP2004/019341

**Box No. V** **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | 1-9 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | | YES |
| | Claims | 1-9 | NO |
| Industrial applicability (IA) | Claims | 1-9 | YES |
| | Claims | | NO |

2. Citations and explanations (Rule 70.7)

Document 1: JP 8-155702 A (Sumitomo Electric Industries, Ltd.), 18 June 1996

Document 2: JP 8-52604 A (Valenite Inc.), 27 February 1996

Document 3: JP 8-52605 A (Valenite Inc.), 27 February 1996

Document 4: JP 2003-175408 A (Sumitomo Electric Industries, Ltd.), 24 June 2003

The inventions set forth in claims 1 and 3 to 7 do not involve an inventive step in the light of document 1 and document 2 or 3 cited in the international search report. Document 1 discloses a throw-away tip which has a sintered body that comprises cubic system boron nitride attached thereto, said throw-away tip comprising a cutting blade, a chamfered section and a tip breaker that is configured from a protruding part and a flat part, wherein specific ranges have been delimited for the angle that is formed by the chamfered section and the upper surface of the tool body, for the width of the chamfered section at the tip of the blade, for the distance between the tip of the apical angle and the top of the protruding part as viewed in-plane, and for the difference between

the height of the tip of the apical angle and the height of the top of the protruding part.

Meanwhile, documents 2 and 3 disclose protruding parts with forms such that the top parts include one pair of ridge lines that are approximately symmetrical relative to the plane bisecting the apical angle, wherein the L1' / L1 value of said protruding parts is similar to the L1' / L1 value of the invention set forth in the present application.

With regards to the numerical limits (i.e., θ and L1 /L2) that are associated with the form of the protruding part:

- although the description presents experimental examples wherein the angle θ was 42°, 50°…82° or 86° when using arbitrary processing conditions (a cutting speed of 120 m/min, a cutting depth of 0.5 mm and a feed rate of 0.2 mm/rev), an arbitrary apex angle ($\alpha$ = 80°) and an arbitrary work material (carburized SCM415), it is unclear whether θ values just inside the range delimited by the boundary values 48° and 82° will impart significantly different effects from θ values just outside said range, or whether θ values just inside the boundary values of a numerical range delimited by the formula [$6 / 10 \times \alpha \leq \theta \leq 90 - 1 / 10 \times \alpha$] will impart significantly different effects from θ values just outside said boundary values even after changing parameters such as the processing conditions, the apex angle or the work material, and thus the numerical range that is delimited for the term θ by means of the abovementioned formula cannot be considered to have a

critical significance; likewise, for the same reason, the numerical range for the ratio L1 / L2 cannot be considered to have a critical significance even with consideration of the disclosures in the description;

- the optimal form and the suitable forms of the protruding part will change in accordance with various factors such as the work material and the processing conditions; and
- it is within the common creative abilities of a person skilled in the art to optimize or improve the form of the protruding part so as to accommodate the various factors indicated above.

Such being the case, it cannot be considered especially difficult to establish the abovementioned numeric limits in the light of these facts.

The inventions set forth in claims 2, 8 and 9 do not involve an inventive step in the light of document 1, document 2 or 3, and document 4 cited in the international search report. Document 4 delimits the ten-point average roughness of the surface, and discloses a feature wherein a coating layer is formed on the surface of the sintered body.